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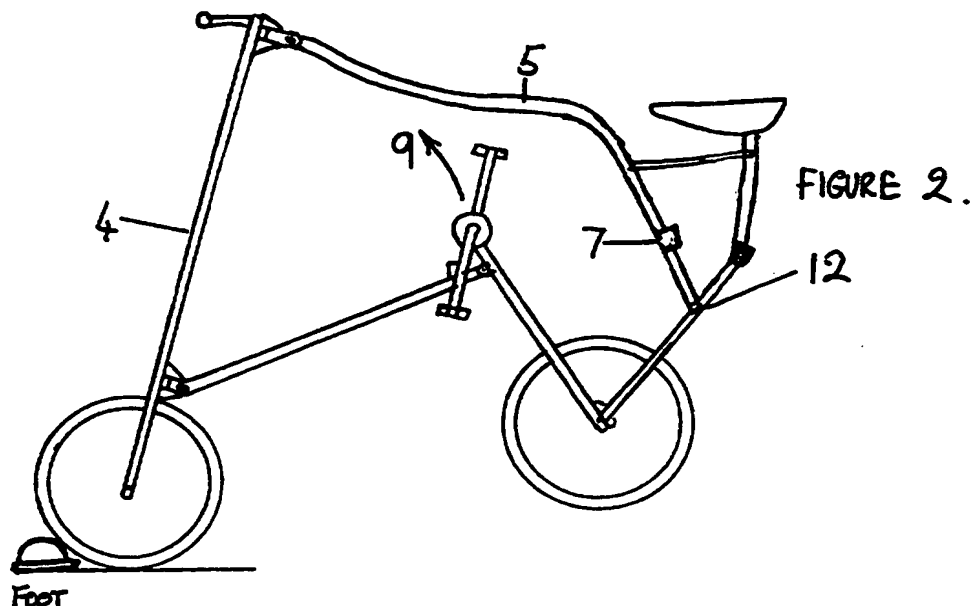
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(56) Documents Cited  
GB 2021055 A EP 0116096 A1 WO 86/05155 A1  
US 4895386 A

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UK CL (Edition O ) B7E ECF  
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## (54) Folding bicycle

(57) A folding bicycle or motorbike which folds and unfolds in one quick movement has an essentially triangular frame which is locked in the riding position by a single self locking catch. The frame includes a two-part hinged lower frame section, a section 4 mounting the handlebars and front forks and a curved cross-bar section 5 comprising two parts joined by a pivot 12. It uses small wheels so that it can fold into itself (Fig. 3) with one wheel fitting above the other within the frame. When folded the bike can be fitted with a cover and accommodated in the boot of car, a locker or cupboard.



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FIGURE 1

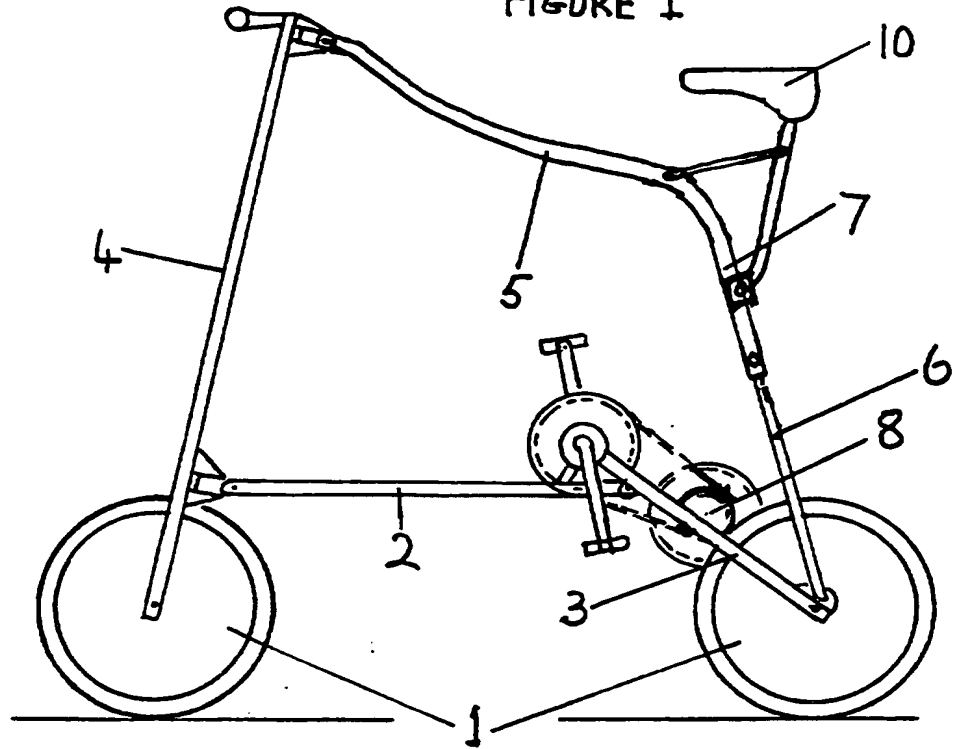
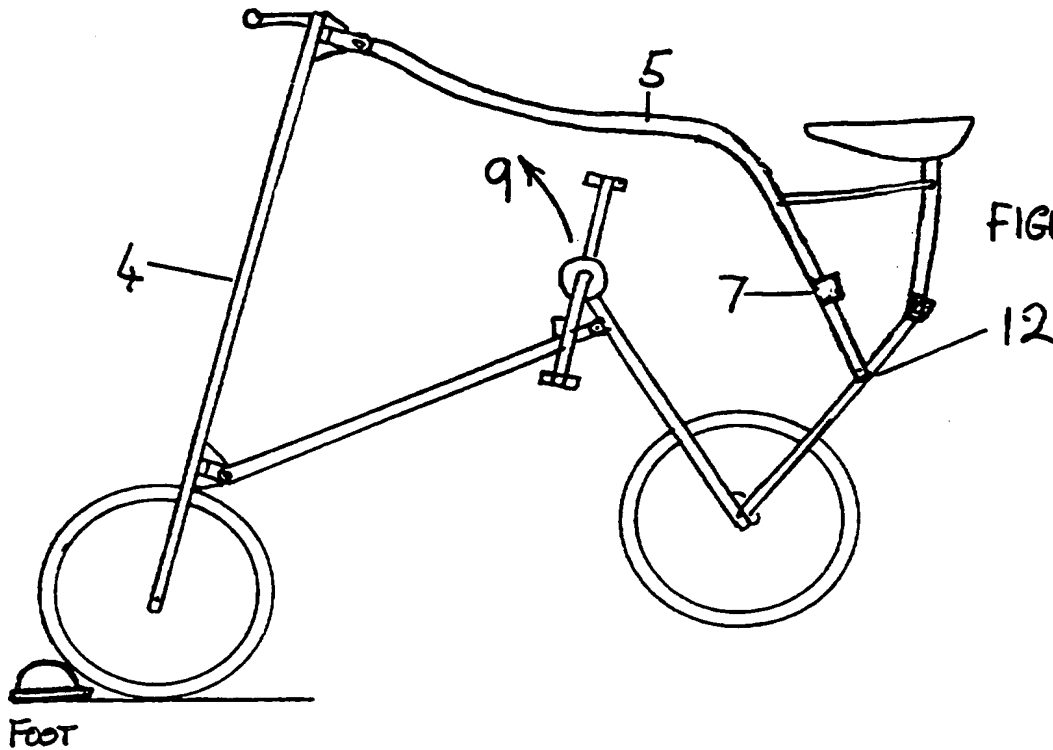
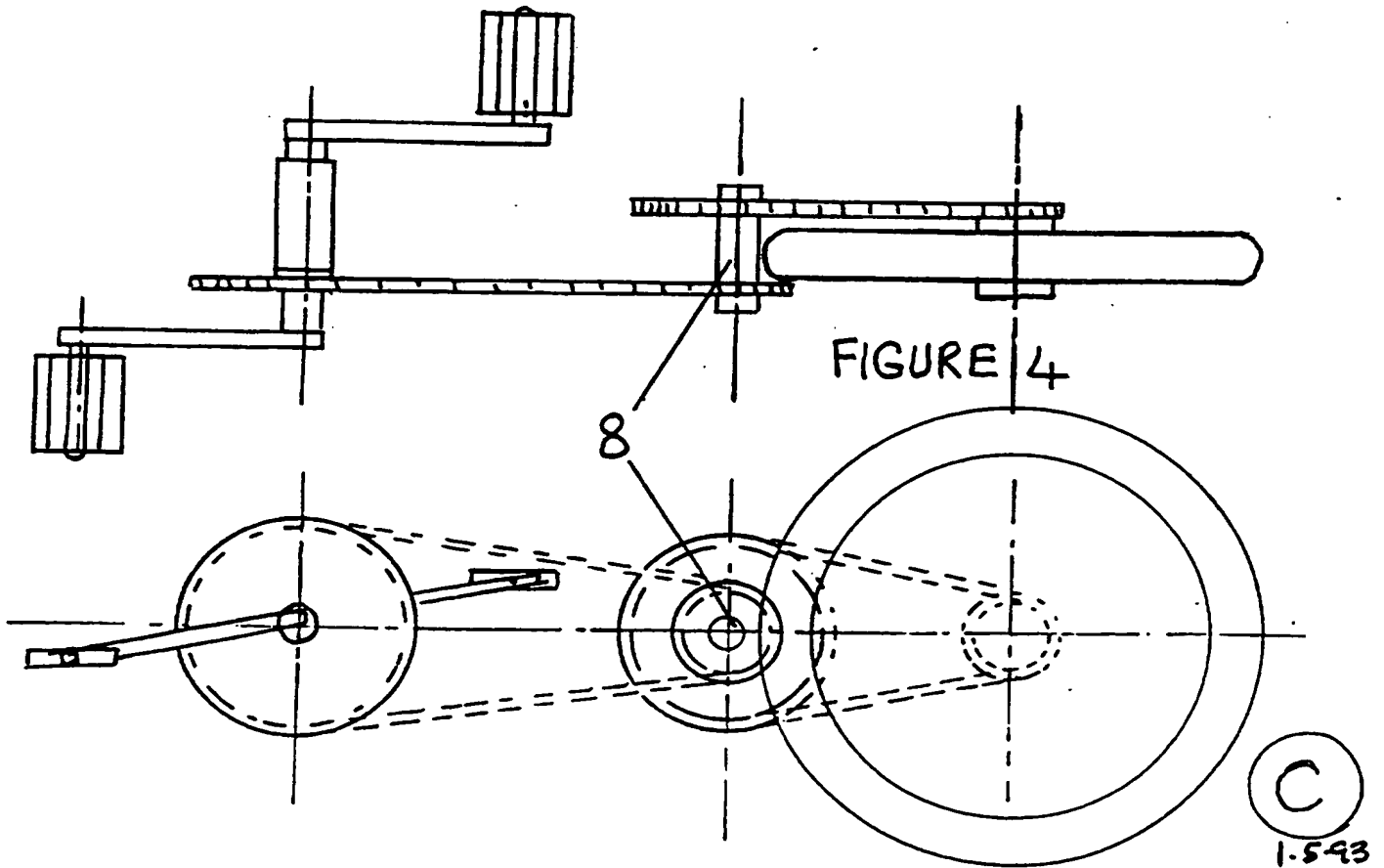
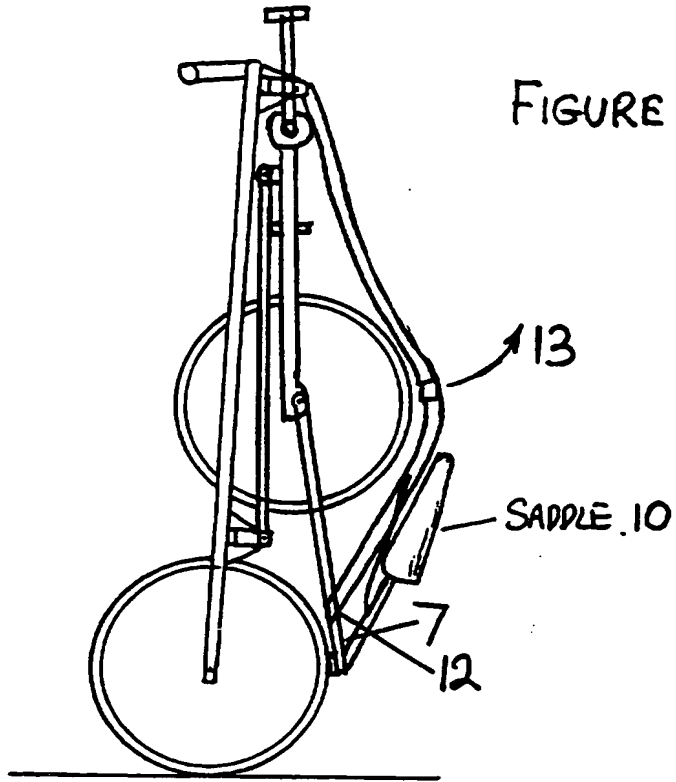
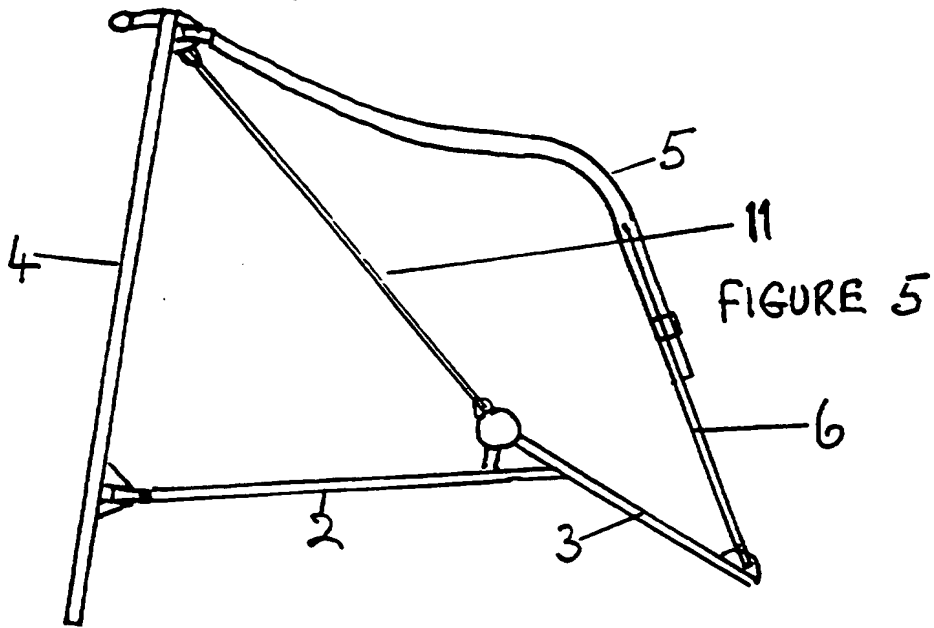


FIGURE 2.







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## FOLDING BICYCLE

This invention relates to an improved folding bicycle.

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There are a number of folding bicycle designs. However, these have the general disadvantages that :-

- 1/ They take some time to fold and unfold.
- 2/ When they are folded they are still inconveniently shaped and fairly large.

This folding bicycle attempts to reduce these disadvantages to the minimum by using two special features.

Firstly, the bicycle frame folds in such a way that one movement completes the unfolding process and a single reverse action folds the bike up. The saddle mounting automatically extends away from the crossbar frame. An automatic catch on the "crossbar" frame locks the frame in the unfolded (riding) position. This catch is released manually to fold up the frame.

Secondly, the bicycle uses small wheels which reduces the overall size of the folded bike but also allows the one wheel to fold above the other within the steering frame further reducing the size. When folded the bike can be wheeled about on the lower (front) wheel so that it does not have to be carried. A locking mechanism could be incorporated to lock the lower wheel to the crossbar frame so that the bike can be stood against a wall when not needed. Because the use of small wheels reduces the overall gearing, an intermediate layshaft can be incorporated in the "power train" in order to restore the velocity ratio to that of the average bicycle.

The bicycle is designed to fold into a long but compact shape suitable for putting into car boots, Yacht lockers, or simply stood against the wall in a cloak cupboard when it could be placed in a cover to keep dirt etc. off floors and cloaks.

The bicycle also incorporates all the normal features found on bicycles such as front and rear brakes, saddle, pedals, handlebars and the necessary ball bearing races. A number of Gears can be incorporated between the pedals and the driving wheel to give a variety of overall ratios.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings which :-

Figure 1 shows a side view of the bicycle in its riding position.

Figure 2 shows a side view of the bicycle half folded.

Figure 3 shows a side view of the bicycle fully folded.

Figure 4 shows a plan of the optional "power train" with the intermediate layshaft (8).

Figure 5 shows the use of an optional wire (11) in tension to strengthen the lower frame.

Referring to Figure 1, the bicycle comprises two small wheels (1) and a triangular frame. The triangular frame consists of a Lower Frame in two parts, forward part (2) and rear part (3), a Steering frame (4), and a "cross bar" frame in two parts forming the hypotenuse (5 & 6). Within the Rear Lower frame is the "Power Train" through which the motive power of the rider is transferred to the rear wheel via two chains and an intermediate layshaft (8) or any other optional gearing system. It is also envisaged that the power train could incorporate a motor, driven either by electricity or petrol powering the rear wheel.

To fold the bicycle, Figure 2, The catch on the Cross bar joint (7) is released and whilst the rider places his/her foot in front of the front wheel to stop it rolling away, one pedal is lifted upwards towards the top of the Steering frame (4), in the direction of arrow (9). This causes the lower frame to bend at its joint near the pedal bearing and draws the rear wheel towards the front wheel. The Cross bar frame (5) also bends at its joint (12). To keep the bike balanced whilst folding, the rider's foot is placed in front of the front wheel, one hand holds the handle bars whilst the other holds the pedal and lifts it upwards towards the handle bars.

When fully folded, Figure 3, the rear wheel lies within the Steering frame and the Crossbar frame fits by the side of the rear wheel with its joint (12) resting against the front wheel. The saddle (10) automatically folds to lie against the Cross bar frame. To unfold:- the Crossbar frame is lifted in the direction of arrow 13 which allows the Lower Frame to fall down into position and the saddle to rise. The crossbar frame catch (7) automatically locks the crossbar frame joint which in turn locks the whole frame.

## CLAIMS

- 1 A folding bicycle comprising a triangular frame. The triangular frame consisting of a "lower frame" jointed in two parts, (a forward part and a rear part), a Steering frame, to which handlebars are attached, and a "Curved Cross bar" frame also in two parts, (an upper part and a lower part,) forming the hypotenuse. The geometry of the triangular frame being such that when folded the rear wheel is housed within the Steering frame above the front wheel.
- 2 A folding bicycle as claimed in Claim 1 wherein the upper and lower parts of the Cross-bar frame are locked with a catch and this single catch locks the whole frame ready for riding.
- 3 A folding bicycle as claimed in Claims 1 or 2 wherein there is a mounting on the cross-bar frame to carry a saddle.
- 4 A folding bicycle according to claim 3 wherein the saddle mounting unfolds simultaneously with the main triangular frame described in claim 1.
- 5 A folding bicycle according to claims 1 to 4 wherein the mounting for the saddle is adjustable for riding position.
- 6 A folding bicycle according to any one of claims 1 to 5 wherein brake cables lead from brake levers on the handlebars to brakes on one or both of the two wheels.
- 7 A folding bicycle according to any one of claims 1 to 6 wherein drive pedals are mounted on the "lower frame" and connected to drive one of the wheels.
- 8 A folding bicycle according to claim 7 wherein the drive member from the pedals to the wheel is a belt or chain.
- 9 A folding bicycle according to claim 8 wherein the connection between the pedals and the wheel incorporates an intermediate layshaft to restore the velocity ratio to approximately that of an average bicycle.
- 10 A folding bicycle according to claim 9 wherein the "power train" between the pedals and the wheel incorporates pulleys or cogs which drive through a freewheel unit and /or a gearbox.
- 11 A folding bicycle according to any one of claims 1 to 10 including a drive motor connected to drive one of the wheels.
- 12 A folding bicycle according to any one of claims 1 to 11 wherein a flexible wire in tension is used to resist the down force on the pedals.
- 13 A folding bicycle substantially as described herein with reference to figures 1-5 of the accompanying drawings.



Application No: GB 9600761.2  
Claims searched: 1-13

Examiner: Brian Denton  
Date of search: 20 February 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B7E (ECF)

Int Cl (Ed.6): B62K 15/00

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2021055 A (HERBERT) whole document	1-8 12
X	EP 0116096 A1 (BRIDGESTONE) whole document	1-8
X	WO 86/05155 A1 (SANDERS) whole document and in particular Figure 14	1-8
X	US 4895386 (HELLESTAM) whole document	1-8

X Document indicating lack of novelty or inventive step  
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

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P Document published on or after the declared priority date but before the filing date of this invention.  
E Patent document published on or after, but with priority date earlier than, the filing date of this application.